DAILY SURVEY OF AIR MONITORING EQUIPMENT

Purpose

This Air Quality Group procedure describes the daily survey of the air monitoring equipment that is part of the LANSCE radioactive air emissions monitoring program. Other equipment important to LANSCE operations is also included in this survey (e.g., HEPA filter pressure drop).

Scope

This procedure applies to the ESH-1 technicians who perform the daily surveys and to the TA-53 emissions team staff members (ESH-17 or LANSCE-FM) who are responsible for the monitoring equipment and review the data.

In this procedure

This procedure addresses the following major topics:

Hazard Control Plan

The hazard evaluation associated with this work applies only to ESH-17 personnel. It is the responsibility of the supervisors of ESH-1 personnel performing this process to ensure all applicable hazards analyses have been performed according to applicable requirements.

The hazard evaluation associated with this work is documented in Attachment 1: Initial risk = **low**. Residual risk = **low**. Work permits required: none. First authorization review date is one year from group leader signature below; subsequent authorizations are on file in group office.

Signatures
(continued on next page)

Prepared by: David Fuehne, ESH-17	Date: 6/13/2000
Work authorized by: Doug Stavert, ESH-17 Group Leader	Date: 6/15/2000

06/22/00

General information about this procedure

Signatures *(continued)*

Approved by: Jesse Salazar, ESH-1 Field Office Coordinator	Date: 6/14/00
Approved by: Scott Miller, ESH-17 Rad-NESHAP Project Leader	Date: 6/14/00
Approved by: Terry Morgan, ESH-17 QA Officer	Date: 6/14/00

Attachments

This procedure has the following attachments:

Number	Attachment Title	No. of pages
1	Hazard Control Plan	2
2	Example of Daily Operational Checks of Stack Monitoring Equipment at Exhaust Stack 2	1
3	Example of Daily Operational Checks of Stack Monitoring Equipment at Exhaust Stack 3	1
4	Example of Kanne Chamber Daily Survey Form	1
5	Historical Locations of TA-53 Kanne Chambers	1
6	Example of Stack Report Form	1

History of revision

This table lists the revision history and effective dates of this procedure.

Revision	Date	Description of Changes
0	6/2/93	New document, issued as HS-1/TA-53-STACK-DP-007.
1	7/21/94	Modified for new equipment and system changes, issued as ESH-1/TA-53-STACK-DP-007.
2	7/11/95	Modified for additional equipment, Kanne chambers, removal of FE-16, and reformatted.
3	9/1/95	Revision to eliminate requirement for copies of daily survey forms to AOT-7 and ESH-17; removed FE-16 part of Attachment 1.
4	7/1/96	Reformatted for use as a TA-53 FM procedure. Minor changes in wording and nomenclature. Issued as 53 FMP 104-07.4.
5	6/20/00	Operational steps revised; new chapter *Staff Review of Survey Data* replaces procedure MP-7-OP-9-04.01; new chapter *Monthly Exchange of Stack Report Forms* (from ESH-17-602); format revised; and issued as ESH-17-607, R5.

General information, continued

Who requires training to this procedure?

The following personnel require training before implementing this procedure:

- **ESH-1 technicians** assigned to perform activities in this procedure
- **ESH-17 emission staff** assigned to TA-53

Training method

The training method for the **emission staff** for this procedure is "**self-study**" (**reading**) and is documented in accordance with the procedure for training (ESH-17-024).

The training method for the **ESH-1 technicians** for this procedure is **on-the-job** training by a previously trained individual. Individuals previously trained to revision 4 may retrain to this revision by "self-study" (reading). All training is documented on the employee development system (EDS) and in accordance with the procedure for training (ESH-17-024).

Prerequisites

In addition to training to this procedure, the following training is also required prior to performing this procedure:

- TA-53 Site Specific training required for unescorted access to TA-53
- Rad Worker I or II required for entry into radiologically controlled areas
- TA-53 Limited Access Area – MEB training required for unescorted access into TA-53, Building 7, room 200 during beam operations to the 1L Target (MLNSC)
- TA-53 Restricted Access Area training if unescorted access to beam lines needed

Definitions specific to this procedure
(continued on next page)

Kanne Chamber: An air flow-through ionization chamber, used to determine concentration of radioactive material in air. A typical Kanne chamber system consists of the ion chamber (5-liter or 50-liter volume), a sample pump, a calibrated flow orifice and pressure gauge, and an electrometer to measure current from the ion chamber. The term "Kanne chamber" is used to refer to the entire system.

General information, continued

Definitions specific to this procedure, *continued*

Facility operation: Memo ESH-17:96-291, "Sampling and Reporting Requirements for LANSCE," dated July 9, 1996, defines monitoring and reporting requirements for TA-53 emissions monitoring facility. Sampling for particulate & vapor activation products must be carried out at all times. Gaseous emission monitoring from the ES-3 stack and diffuse monitoring of the beam switchyard (by the SY Kanne chamber system) must occur when any beam is delivered to the switchyard or beyond. When beam is delivered down Line A, diffuse monitoring must occur for designated areas. When beam is delivered down Line D, gaseous emissions monitoring at the ES-2 stack must take place.

References

The following documents are referenced in this procedure:

- ESH-17-RN, "Quality Assurance Project Plan for the Rad-NESHAP Compliance Project"
- ESH-17-024, "Personnel Training"
- ESH-17-026, "Deficiency Reporting and Correcting"
- ESH-17-605, "Gamma Spectroscopy Data Collection for Gaseous Emissions at TA-53 Stacks," currently under revision from TA-53 procedure 53FMP 104-05
- ESH-17-608, "Monthly Curie Projection for LAMPF"
- Memo ESH-17:96-291, "Sampling and Reporting Requirements for LANSCE," dated July 9, 1996.

Note

Actions specified within this procedure, unless preceded with "should" or "may," are to be considered mandatory guidance (i.e., "shall").

Stack surveys

Background

The Quality Assurance Project Plan (QAPP) for the ESH-17 Rad-NESHAP Project (ESH-17-RN) sets the stack data completeness requirement at 85%. To assure that the highest possible level of data capture and data quality are attained, an **ESH-1 technician** performs daily physical surveys of equipment status.

Purpose of stack surveys

The stack surveys are used as part of the 95% data capture documentation. Surveys also ensure that the systems are functioning properly and that proper flow rates are maintained throughout the day.

Frequency of stack surveys

During accelerator maintenance periods, **ESH-1 technicians** perform the stack surveys in the early morning of each working day. During beam production, the **night crew** performs the surveys each day at midnight. If priority experiments are being conducted that prevent the survey from being performed exactly at midnight, the stack survey should be performed as close to midnight as possible for uniformity in data analysis.

Electronic data logging (Data Scan Re-Play)

Many of the stack systems and Kanne chamber systems have data logged by the Central Control Room (CCR) computer system, called Data Scan Re-Play (DSRP). The data from this system can be used for analysis and reporting purposes, as long as the data values are cross-checked with ESH-1 technician surveys and/or chart records. At times, conversion equations may need to be developed to translate DSRP values to “real” data values. These conversion equations are developed and maintained by LANSCE-FM or ESH-17 emissions staff.

On-call personnel

The **emissions staff** posts the name of emissions staff member on-call at each stack station, in the ESH-1 Field Office, in the Central Control Room, and on the door of the primary emissions staff member.

Stack surveys, continued

Adjusting flow rates, notifying on-call personnel

Several times in this procedure, the **ESH-1 technician** is asked to adjust flow rates if necessary and call the emissions staff member on call if unable to adjust sample flows. Any time an adjustment is made to any system, note the change and the reason for the change on the stack survey form or in the stack logbook.

Likewise, the **ESH-1 technician** calls the emissions staff member if there is ever any doubt on the proper course of action or if a situation "seems wrong." **Emissions staff** communicates any changes to the systems to the ESH-1 crews via the ESH-1 Logbook. The ESH-1 Logbook is maintained electronically on the ESH-1 server.

ES-2 instrument locations

All instrumentation is located in the Mechanical Equipment Building (MEB), located at TA-53, building 7, room 200.

Note that during beam operations to the 1L Target (Manuel Lujan Neutron Scattering Center, MLNSC), a supplemental, alarming Electronic Personnel Dosimeter (EPD) is required for entry.

ES-3 instrument locations

The particulate/vapor sample system pump and associated gauges are located on the 23-foot-level of Area A (TA-53, building 3M, room M300), at the center of the west wall. It is designated the "Merrimac" pump due to its location next to the historical site of the Merrimac remote handling unit.

The remaining stack instrumentation is located in the building 3M, room M105. This area is referred to as "TOFI" due to the "Time-Of-Flight Isynchronous" spectrometer that was historically located at this area.

Chart maintenance

ESH-1 technician changes the chart paper when a red stripe appears along the side of the paper. If chart pens (red, green, or purple) are faint, change with fresh. The size of pens and type of paper (logarithmic or linear scale) is indicated on each chart. Supplies for chart recorders (paper, pens) are kept in the TOFI area (TA-53, building 3M, room M105).

Forms to use

The forms to be used by ESH-1 technicians are maintained in the ESH-1 Field Office, and samples are given in Attachments 2 and 3. Note that the forms may be updated by the **emissions staff** throughout the operating period to reflect required changes in the survey.

Stack surveys, continued

Entering data

ESH-1 technician makes all data entries in the "As-Found Value" box for each instrument. "Desired Values" for each instrument are noted on the survey form and also posted next to each gauge for most instrumentation.

Perform instrument checks

ESH-1 technician picks up a copy of the appropriate form (either attachment 2 for ES-2 or attachment 3 for ES-3) and performs the checks in the order listed on the form.

How to record integrated current on LANL Model-39 electrometers

The stack Kanne chambers are equipped with LANL Model 39 electrometers, which record integrated current.

The display of the integrator shows only three digits. To change which digits are displayed, adjust the "thumb-wheel" setting on the electrometer.

Turn the wheel to number "6" (six). This will display the hundred millions, ten millions, and one millions digits. Record these first three digits on the survey form, including "zeros" if present.

Next turn the wheel to number "3" (three) to display the hundred thousands, ten thousands, and one thousands digits. Record these digits on the integrator form following the previous three.

Turn the wheel to the number "0" (zero) to display the hundreds, tens, and ones digits. Record these three digits on the form following the previous six digits.

Example: if the integrator has collected 14,508,913 picocoulombs, the digits will appear in the display and should be recorded as follows:

Thumb-wheel Setting	Displayed digits	Recorded reading
6	0 1 4	014,
3	5 0 8	014,508,
0	9 1 3	014,508,913

Kanne chamber surveys

Purpose of KANNE chamber surveys

Non-point (diffuse) emissions are monitored by measuring building radioactive air concentrations with Kanne flow-through ionization chambers. Other Kanne chambers are used for determining occupational work limits. At times, adjustments are required to maintain the proper flows and electronic signal amplification (on some equipment).

The Kanne chambers are used in TA-53 areas where there is potential for activated air to escape from around the beam line into surrounding building rooms. Different experiment stations or emissions control systems may have a Kanne chamber incorporated into them as well. Each of these Kanne locations will be identified prior to the run cycle, and their survey status maintained on the survey board in the ESH-1 field office. If additional Kanne chambers are set up and operated by the staff, they will need to be added to the survey. **Emissions staff** communicates these new survey requirements for additional Kanne Chambers (along with their locations) to ESH-1 via a note posted in the ESH-1/TA-53 field office and/or an entry in the ESH-1 logbook.

Kanne instruments used

The Kanne Chambers used at TA-53 have either a LASL Model 39 integrating electrometer, Keithley Model 412 Micro-microammeter, or a Keithley 485 Auto-ranging pico-ammeter to measure the current from a 50 liter Kanne Chamber. They all have a sample pump and most are equipped with chart recorders. These systems require daily attention to set flow rates, check chart paper, and adjust the electronics and data retrieval.

Forms to use

A sample Kanne Chamber survey form is included as Attachment 4. This form is available in the ESH-1 Field Office, or electronically from the Emissions staff. Note that the form is a sample only; depending on the number of Kanne chambers being surveyed, the Kanne chambers might be included as entries on the stack survey forms.

Frequency of Kanne surveys

Immediately following the stack surveys, **ESH-1 technicians** make surveys of individual Kanne chamber systems only during beam operation to the area monitored by that Kanne system.

Kanne chamber surveys, continued

Locations of Kanne chambers

The Kanne Chambers are used throughout the TA-53 areas where the potential for significant air activation is present. Throughout the run cycle, additional Kanne Chambers may be set up and will need to be added to the survey. **Emission staff** identifies these additional Kanne Chambers (along with their locations) via a posting in the ESH-1/TA-53 field office or as entries in the ESH-1 Shift Log. Attachment 4 describes the locations of historical sampling sites:

LANL Model 39 systems

Some Kanne chambers use Model 39 electrometers. Integrated current from these systems is read as described above in the "Stack Surveys" chapter.

How to check Keithley 412 electronics

Skip for other electrometer types.

Turn the operate/calibrate knob to the "zero balance" setting. Record voltage reading from the chart recorder.
Turn the O/C knob to the 10^{-8} setting and record the voltage reading.
Turn the O/C knob to the 10^{-11} setting and record the voltage reading.
When complete, return to the OPERATE position.

RCTs DO NOT adjust the settings with the pot screws. TA-53 Emissions staff members will periodically adjust as needed.

Record other information

At times, the **emissions staff** may request the ESH-1 technicians to document other information as part of the Kanne survey, regarding experiments, emissions controls, etc. Such requests will be fully explained as part of the ESH-1 Shift Log or other communication means. If such information is requested, the **ESH-1 technician** records the information in the appropriate location on the survey form.

Perform instrument checks

ESH-1 technician picks up a copy of the form (attachment 4) and performs the checks in the order listed on the form.

Return completed form

ESH-1 technician signs and delivers the Kanne Chamber Daily Survey form to the Staff Office (if Kanne readings are included with stack form, a single signature on stack form is sufficient).

Staff review of survey data

Background

The **staff member** assigned to the stack monitoring at TA-53, or the designee, needs to review all of the daily surveys. This is to keep up to date on the status of the various components within the system, examine long term trends, and be notified of sudden changes from the normal operation of the system. During operation, this is critical to maintain the 95% data capture for the run cycle and for reporting the daily output of curies as required by ESH-17-608.

Steps to review data

To review the survey data, the **assigned staff member** performs the following steps:

Step	Action
1	The daily surveys by ESH-1 should be completed and delivered to the staff office first thing every morning. If they are not received, call the Field Office and have them performed and delivered.
2	Review all entries on the form to verify that all settings were found within acceptable tolerances. If not, generate a deficiency report according to ESH-17-026.
3	Input the data from the daily surveys into the appropriate Excel workbook (e.g., "2000day.xls").
3	After review of all survey forms, sign and date the form in the signature box at the bottom.
4	If requested by other organizations, send these organizations a copy via e-mail, fax, or surface mail.
5	File the completed survey forms into the appropriate binder.
7	During beam production periods to 1L or A6, determine the curies emitted for the previous day according to ESH-17-608.
8	Periodically (monthly or at discretion of staff), plot HEPA pressure data and stack flow data for each of the monitored stacks. This will provide a graphical indication of gradual changes in stack flow, or problems such as filter fouling, filter leakage, etc. Initial these plots and provide comments as necessary on the plots. File the printouts in the Stack Gas Studies notebook. If necessary, coordinate fixes with the Facility Management team. If filters require changing or other major fixes are required, coordination between LANSCE operations, JCNNM, and other groups will be necessary. Additional permits (e.g., a Radiological Work Permit or Hazard Control Plan) may be necessary.
9	Periodically during beam delivery to 1L or A6, or at discretion of staff, calculate the ratio of emitted curies to microampere-hours of beam current operation. Once the facility has achieved steady beam production, this number should stay fairly constant.

Staff inspection of electronic data logs

Background

The daily survey provides only a "snapshot in time" of the functionality of stack instrumentation. As a check against the survey data, and for a more detailed recording, many of the stack and diffuse emissions equipment is equipped with electronic data logging, through the LANSCE Central Control Room (CCR) computer system. The real-time data logging system is called "Data Scan," and the retrieval of logged data is called "Data Scan Re-Play" (DSRP).

Steps to review data

To review the survey data, the assigned **emissions staff** member performs the following steps:

Step	Action
1	Each workday during beam operation, generate printouts of appropriate electronically monitored instrumentation from the DSRP system. Parameters can include stack Kanne chamber currents, stack flows, sample system flows, beam current, and other items at discretion of staff.
2	Compare the values recorded by the ESH-1 technician with the corresponding data from the DSRP plots. If there is a discrepancy, investigate the situation and determine the cause. Perform the appropriate fix on the system, or coordinate having the fix performed.
3	During beam operation to A6, DSRP can be used to determine the ratio of 511 keV gamma rays to picocoulombs recorded on the 5L Kanne chamber. In steady operations, this number should stay fairly constant over time. The ratio will vary between configurations, during decay curve measurements, after ion chamber performance tests, and during times of no or little beam operation. The levels recorded on DSRP should scale with the levels measured during each PHA run and recorded according to procedure ESH-17-605.

Monthly exchange of stack report forms

Background

The Stack Report Forms, discussed in the ES-2 and ES-3 stack survey chapters above, serve as a backup to the daily survey form. Each day, the integrated current reading from each stack's primary Kanne chamber is recorded onto the stack report form, as well as the survey form.

When to exchange forms

At the beginning of each monthly reporting period, the **emissions staff** notifies ESH-1 technicians performing the survey to exchange the stack report form. These forms are maintained in the ESH-1 Field Office; an example is given in Attachment 6. Alternatively, **emissions staff** can exchange the form at the appropriate time.

Steps to review data

To exchange the stack report form, the designated individual performs the following steps:

Step	Action
1	Obtain 2 stack report forms from the Emissions staff or from the supply in the ESH-1 Field Office's "Form" filing cabinet.
2	At each stack, exchange the existing form with the new form. The same series of numbers should be recorded as the final entry on the "old" form AND the first entry on the "new" form, allowing simple tracking of data between forms.
3	Return the completed stack report forms to the Emissions staff member's office (along with the daily survey form, if applicable).

Records resulting from this procedure

Records

The following records generated as a result of this procedure are to be filed by the staff and delivered to other laboratory personnel as indicated:

- Daily Survey Forms (Attachments 2, 3, and 4 as needed), staff copies; additional copies to other groups upon request
- Calculation of daily curies emitted (Excel); to distribution and file (if required or requested)
- Monthly Stack Report Forms (Attachment 6); filed with daily surveys at end of month
- Printouts of emissions monitoring instrument readings from the DSRP system, filed in “DSRP” binder
- All plots, graphs, and calculations performed as part of emissions calculations and trending (may be maintained electronically); in Stack Gas Studies binder or other binder as appropriate
- Any communication between staff and ESH-1 technicians regarding the survey items; maintained electronically in the ESH-1 Shift Log and in the Shift Log printouts maintained by ESH-1

HAZARD CONTROL PLAN

1. The work to be performed is described in this procedure.
"Daily Survey of Air Monitoring Equipment"

2. Describe potential hazards associated with the work (use continuation page if needed).

For Field Work, the following hazards apply:

1) Radiation hazards
   a) external radiation (working in controlled areas, radiation areas, high rad areas, etc.)
   b) contamination (contamination areas are encountered throughout TA-53; internal surfaces of emissions sampling systems are considered contaminated until proven otherwise)
2) Mechanical equipment hazards (mechanical & kinetic energy; working near such equipment)
3) Electrical hazards (working near high AC and DC voltage)
4) Cranes (work in areas with overhead cranes)
5) Cryogen hazards (working near ultracold fluids)
6) Chemical hazards (working near hazardous chemicals)
7) Pressurized gas bottle hazards (working near pressurized systems & gas bottles)
8) Slow-moving vehicles (encountering them on road OR driving them)

-- See continuation page. --.

3. For each hazard, list the likelihood and severity, and the resulting initial risk level (before any work controls are applied, as determined according to LIR300-00-01.0, section 7.2)

1) Radiation Hazards:
   a) external rad: frequent / negligible = Low
   b) contamination: improbable / negligible = Minimal
2) mechanical: improbable / critical = Low
3) electrical: improbable / critical = Low
4) cranes: improbable / critical = Low
5) cryogens: occasional / moderate = Low
6) chemicals: improbable / critical = Low
7) pressurized gas: improbable / moderate = Minimal
8) slow vehicles: occasional / moderate = Low
9) work area (all): occasional / moderate = Low

Overall *initial* risk: ☐ Minimal ☐ Low ☒ Medium ☐ High

4. Applicable Laboratory, facility, or activity operational requirements directly related to the work:
☐ None ☒ List: Work Permits required? ☒ No ☐ List:

LIR-402-706-01 "Personnel Dosimetry"
Controlled areas at TA-53 require a TLD for access.
Limited Access Areas at TA-53 require supplemental dosimetry for access during beam operations

HAZARD CONTROL PLAN, continued

5. Describe how the hazards listed above will be mitigated (e.g., safety equipment, administrative controls, etc.):

APPLICABLE TO ALL HAZARDS: Be aware of surroundings, read & obey all postings. If situation appears to be unsafe, contact system owner or the TA-53 Central Control Room (667-5729) for assistance and advice. Obey all rules & utilize PPE as required for work in specific areas.

1-a & b) rad hazards: wear applicable dosimetry, read all postings, consult with ESH-1 (667-7069) to discuss RWP needs and other radiological issues. Plan work in advance to keep exposures ALARA. Do NOT cross any radiological control barriers (e.g., yellow & magenta tape)

2) mechanical systems: Do not work on any facility mechanical equipment. If unsafe situation is observed (missing belt cover, etc.) or work on system is required, contact building manager & stay away.

3) electrical systems: Do not block access to power panels. Do not attempt to work on systems. Contact building manager or system owner for maintenance or other work.

--- see continuation page ---

6. Knowledge, skills, abilities, and training necessary to safely perform this work (check one or both):

☒ Group-level orientation (per ESH-17-032) and training to this procedure.

☒ Other → See training prerequisites on procedure page 3. Any additional describe here:

ESH-1 personnel: other training as determined by ESH-1/TA-53 Team Leader

7. Any wastes and/or residual materials? (check one) ☒ None ☐ List:

(Used filter media or analytical residue is disposed by the analytical laboratory.)

8. Considering the administrative and engineering controls to be used, the *residual* risk level (as determined according to LIR300-00-01.0, section 7.3.3) is (check one):

☐ Minimal ☒ Low ☐ Medium (requires approval by Division Director)

9. Emergency actions to take in event of control failures or abnormal operation (check one):

☐ None ☒ List:

During LANSCE accelerator operation, the Central Control Room (CCR) and ESH-1 offices are staffed 24 hours, 7 days. Contact these offices for assistance as needed.

CCR: 667-5729; Building 4, room 203.

ESH-1 Field Office: 667-7069, Building 395, room 101.

Signature of preparer of this HCP: This HCP was prepared by a knowledgeable individual and reviewed in accordance with requirements in LIR 300-00-01 and LIR 300-00-02.

Preparer(s) signature(s)	Name(s) (print) /Position	Date

Signature by group leader on procedure title page signifies authorization to perform work for personnel properly trained to this procedure. This authorization will be renewed annually and documented in ESH-17 records. Controlled copies are considered authorized. Work will be performed to controlled copies only. This plan and procedure will be revised according to ESH-17-022 and distributed according to ESH-17-030.

HAZARD CONTROL PLAN, continued

Hazard Control Plan continuation page. Give item number being continued.

#2. Describe potential hazards:

9) General work area hazards
- a) uneven floors (one room can have multiple "levels")
- b) slips, trips, falls (cart rails on floors, cables, etc.)
- c) snow & ice (some areas continuously in shade; FALLING ICE)
- d) lighting concerns (underground beam lines = no natural light)
- e) low headroom (beam lines, low signs, cable trays)
- f) cramped conditions (narrow access ways)
- g) noise (fans, power supplies, machinery)
- h) wildlife (snakes, racoons, mountain lions, elk)
- i) miscellaneous/general (e.g., fire in building, low oxygen, evacuation required)

#5. Mitigation of hazards:

4) Cranes: be aware of surroundings in areas with cranes. Stay out of crane "cone of safety" when in areas with cranes in operation. This "cone of safety" is defined as a cone, based at floor level and centered under the crane load, with radius equal to height of the crane load above the floor, and a height from the floor to the crane load. DO NOT WORK IN AREAS INSIDE THIS CONE OF SAFETY. More information in Site-Specific training (see section 6, above).

5) Cryogens: listen for low oxygen alarms if working in area with cryogens present.
6 & 7) chemicals and pressurized gas systems: be aware of systems in area. If unsafe situation identified, contact control room or system owner.

8) Slow vehicles: be aware of other vehicles, obey speed limits. If driving putzers, allow others to pass if possible. DO NOT DRIVE FORKLIFTS UNLESS PROPERLY TRAINED.

9) work area hazards:

a - c) Contact building manager or system owner to mitigate extreme situations (move cables, sprinkle salt/sand on ice, etc.).

d) carry flashlight at all times if working in underground areas; take "TA-53 Restricted Access" training if working extensively in beam tunnels.

e) Wear hard hat or bump cap if extensive work required in such areas.

f) Do not block egress routes in cramped areas. Perform work in more open areas if possible.

g) Note ESH-5 postings of noisy areas; call the FM office (665-2584) for questions. Wear earplugs when required, or any other times when personally desired.

h) Contact FM office (665-2584) to notify animal control.

i) Know your evacuation routes in each building where work is to be performed. Know the location of nearest telephone or communication box.

ESH-17 Air Quality Group

DAILY OPERATIONAL CHECKS OF STACK MONITORING EQUIPMENT AT EXHAUST STACK 2 (ES-2)

This form is from ESH-17-607

DATE: TIME:

ITEM	Desired Value or Range	As-Found Value	Action if outside desired range
Total Stack Flow	> 0.16 in. H_2O		Contact emissions staff
Stack Flow Chart (V)	Greater than 1.6 V		
Chart paper and pens	Paper OK, pens OK		Change paper or pens
KANNE Chamber reading	Thumb-wheel set → Displayed values →	6 3 0 - - — — — = = = — — —	Copy the same reading onto the "Stack Report Form" at the stack.
Kanne Chart Ch. 1 (V)	Greater than zero		Contact emissions staff
Kanne Chart Ch. 2 (V)	Greater than zero		Contact emissions staff
Chart paper and pens	Paper OK, pens OK		Change paper or pens
Kanne Sample Flow	----------		
Adjust KANNE sample flow	0.28 ± .05 in. H_2O	----------	Contact emissions staff
Temperature (F)	- - - - - - - - -		
Tritium Sample Flow	100 cc/min ± 10		Contact emissions staff
Silica gel OK	Greater than 75% blue		
Particulate Sample Flow	----------		
Adjust sample flow	0.11 ± 0.05 in. H_2O	----------	
ΔP Prefilter bank (east)	Less than 0.5 in. H_2O	*	Contact emissions staff*
ΔP HEPA filter bank (west)	0.8 – 1.2 in. H_2O	*	Contact emissions staff*
Date of last LN fill	Filled twice a week; within last 4 days		Fill or note on form for emissions staff.
1L target cell negative pressure (photohelic Gauge located on west wall of MEB)	> 0.10 inches, to the RIGHT of zero		Contact emissions staff AND the Central Control Room immediately
HEPA bank radiation level (GA-6) (meter readout near MEB entrance)	Less than 25 mrem/hour		Exit the MEB now; proceed to CCR, and notify both CCR and the emissions staff.

Sign below and deliver completed forms to emissions staff.

Measurements by:

_____ _____ _____/_____/_____

ESH-1 Signature | Print name | Date

Data reviewed by:

_____ _____ _____/_____/_____

Staff Reviewer Signature | Print name | Date

* If flows are both quite high or low, there may be an emergency situation (assuming the stack flow is normal). Filters may be blown out, or are over-loaded and about to be blown out. Immediately notify Emissions staff on-call.

ESH-17 Air Quality Group

DAILY OPERATIONAL CHECKS OF STACK MONITORING EQUIPMENT AT EXHAUST STACK 3 (ES-3)

This form is from ESH-17-607

DATE:		TIME:	
ITEM	**Desired Value**	**As-Found Value**	**Action if outside desired**
Particulate flow (Merrimac)	----------		
Adjust particulate flow	0.11 ± 0.05 in. H_2O	----------	Contact emissions staff
Total Stack Flow	>0.12 in.. H_2O		Contact emissions staff
Total Stack Flow Chart (V)	Greater than 1.2 V		
Chart paper and pens	Paper OK, pens OK		Change paper or pens
5 liter Integrator Reading	Thumb-wheel set → Displayed values →	6 3 0 - - — — — = = = — — —	Copy the same reading onto the "Stack Report Form" at the stack.
Chart paper and pens	Paper OK, pens OK		Change paper or pens
5 liter Chart Ch. 1 (V)	Greater than zero		Contact emissions staff
5 liter Chart Ch. 2 (V)	Greater than zero		Contact emissions staff
5 liter Sample flow (rack)	----------		
Adjust sample rack flow	1.00 ± 0.05 in. H_20	----------	Contact emissions staff
5 liter Sample flow (inline)	~ 0.85 in. H_20		
5 liter Sample vac. Pressure	~ 10 in. H_20		
East HEPA Bank ΔP	0.5 – 1.0 in. H_2O		Contact emissions staff*
West HEPA Bank ΔP	0.5 – 1.0 in. H_2O		Contact emissions staff*
Tritium Flow (cc/min)	----------		
Adjust tritium sample flow	100 ± 10 cc/min	----------	Contact emissions staff
Temperature (F)	- - - - - - - - -		
50 liter sampling location	A1 / A2 / A3 / **A6**	----------	If OFF, skip next 5 lines.
50 liter Integrator Reading	Thumb-wheel set → Displayed value →	6 3 0 - - — — — = = = — — —	
50 liter Chart (V)	Greater than zero		
Chart paper and pens	Paper OK, pens OK		Change paper or pens
50 liter sample flow (inline)	~ 2 in. H_20		
50 liter sample vac. Press	~ 12 in. H_20		
A-1 Duct pressure	- - - - - - - - -		
A-2 Duct damper position	0 / 45 / 90		
A-2 Duct pressure	- - - - - - - - -		
A-6 Duct damper position	0 / 45 / 90		
A-1 Booster Status	ON / OFF		
A-1 Booster ΔP	- - - - - - - - -		
A-6 Booster Status	ON / OFF		
A-6 Booster ΔP	- - - - - - - - -		
Date of last LN fill	Filled twice a week; within last 4 days		Fill or note on form for emissions staff

Measurements by:

_____ _____ _____/_____/_____

ESH-1 Signature | Print name | Date

Data reviewed by:

_____ _____ _____/_____/_____

Staff Reviewer Signature | Print name | Date

ESH-17 Air Quality Group

DAILY OPERATIONAL CHECKS OF TA-53 KANNE CHAMBERS

This form is from ESH-17-607

DATE: TIME:

KANNE chamber location	System Readings: current	System Readings: chart volts	Calibration Check (K-412) or Integrator Reading (Model-39)			Flow Pressure
Ring Equipment Building (REB) **Keithley 412**	K-412 Current Amp	Volts V	ZeroBal V	10^{-11} V	10^{-8} V	Flow ΔP
Switchyard (SY) **Keithley 412**	K-412 Current Amp	Volts V	ZeroBal V	10^{-11} V	10^{-8} V	Flow ΔP
A6 (top of doghouse) **Keithley 412**	K-412 Current Amp	Volts V	ZeroBal V	10^{-11} V	10^{-8} V	Flow ΔP
Area A-East Rover **LANL Model 39**	Meter Current pA	Volts V	Full Scale **1 nA**	Integrator Reading _ _ _ _ _ _ _		Flow ΔP
Isotope Production (IP) **Keithley 412**	K-412 Current Amp	Volts V	ZeroBal V	10^{-11} V	10^{-8} V	Flow ΔP
Area A-North Catwalk (AAN) **LANL Model 39**	Meter Current pA	Volts V	Full Scale **10 pA**	Integrator Reading _ _ _ _ _ _ _		Flow ΔP
Area A-South Catwalk (AAS) **LANL Model 39**	Meter Current pA	Volts V	Full Scale **10 pA**	Integrator Reading _ _ _ _ _ _ _		Flow ΔP
Delay Line 20 min. signal (DL-20) **Keithley 485**	K-485 Current nA	Volts V	Flow ΔP			
HRS Dome Air **Keithley 485**	K-485 Current nA	Volts mV	Flow ΔP			

Chart paper and pens OK? Change paper or pens if paper is low or pens are faint.

Other information documented (as requested and explained in ESH-1 Shift Log or other communication from emissions staff):

Sign below and deliver completed forms to emissions staff.

Measurements by:

_____ _____ _____/_____/_____

ESH-1 Signature | Print name | Date

Data reviewed by:

_____ _____ _____/_____/_____

Staff Reviewer Signature | Print name | Date

HISTORICAL LOCATIONS OF TA-53 KANNE CHAMBERS

Beam Switch Yard (SY)	Located in the service isle in MPF-3 Bld 3S at the top of the stairs from Area-A. Used to measure diffuse emissions from the beam switchyard. Still in use in 2000.
Ring Equipment Bld. (REB)	Located in MPF-28 on the east wall directly above Zone 4 of the Proton Storage Ring. Used to measure buildup of radioactive air in the PSR as a personnel safety issue; not for diffuse emissions. Still in use in 2000.
Area-A East Rover (AAE-Rover)	Located inside Area-A East outside of the control area fence. Used to measure radioactive air buildup from the A6 beam stop area, in various parts of Area A-East. Operations ceased in December 1998.
A6 Kanne (A6)	Located inside Area-A East outside of the control area fence. Used to measure radioactive air buildup from the A6 beam stop area, in a dedicated location directly above the beam stop. Operations ceased in December 1998.
Area A - North Catwalk (AAN)	Located in Area-A on the 23' level near the northwest corner. Used to measure radioactive air buildup in Area A, from use of the A1 and A2 targets. Operations ceased in November 1996.
Area A-South Catwalk (AAS)	Located in Area-A on the 23' level near the southeast corner. Used to measure radioactive air buildup in Area A, from use of the A1 and A2 targets. Operations ceased in November 1996
Isotope Production (IP)	Located in the Staging Area building at ground level, at the east end of the building., directly north of Area-A East. Operations ceased in December 1998.
High Resolution Spectrometer (HRS) Dome Air, Area-C	Located just out side of the HRS dome entrance. Used to measure buildup of radioactive air buildup in the HRS dome, from delay line operations. Not a diffuse emission, since the some is vented through the ES-3 stack. Operations ceased December 1998.
Delay Line 20-minute sample port (DL-20)	Located just out side of the HRS dome entrance. Used to measure radioactive air levels in the delay line. Not a diffuse emission, since the delay line is vented out the ES -3 stack. Operations ceased December 1998.

ESH-17 Air Quality Group

STACK REPORT FORM FOR EXHAUST STACK ES-_____

This form is from ESH-17-607

Log #	2000 Date	Time	Integrator Reading (picocoulombs) Model 39A electrometer thumb-wheel setting /------ 6 ------\	/------ 3 ------\	/------ 0 ------\	ESH-1 Technician initials / comments
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ESH-17 Air Quality Group

DAILY OPERATIONAL CHECKS OF STACK MONITORING EQUIPMENT AT EXHAUST STACK 2 (ES-2)

This form is from ESH-17-607

DATE:		TIME:	
ITEM	**Desired Value or Range**	**As-Found Value**	**Action if outside desired range**
Total Stack Flow	> 0.16 in. H_2O		Contact emissions staff
Stack Flow Chart (V)	Greater than 1.6 V		
Chart paper and pens	Paper OK, pens OK		Change paper or pens
KANNE Chamber reading	Thumb-wheel set → Displayed values →	6 3 0 - - — — — ═ ═ ═ — — —	Copy the same reading onto the "Stack Report Form" at the stack.
Kanne Chart Ch. 1 (V)	Greater than zero		Contact emissions staff
Kanne Chart Ch. 2 (V)	Greater than zero		Contact emissions staff
Chart paper and pens	Paper OK, pens OK		Change paper or pens
Kanne Sample Flow	----------		
Adjust KANNE sample flow	0.28 ± .05 in. H_2O	----------	Contact emissions staff
Temperature (F)	- - - - - - - - -		
Tritium Sample Flow	100 cc/min ± 10		Contact emissions staff
Silica gel OK	Greater than 75% blue		
Particulate Sample Flow	----------		
Adjust sample flow	0.11 ± 0.05 in. H_2O	----------	
ΔP Prefilter bank (east)	Less than 0.5 in. H_2O	*	Contact emissions staff*
ΔP HEPA filter bank (west)	0.8 – 1.2 in. H_2O	*	Contact emissions staff*
Date of last LN fill	Filled twice a week; within last 4 days		Fill or note on form for emissions staff.
1L target cell negative pressure (photohelic Gauge located on west wall of MEB)	> 0.10 inches, to the RIGHT of zero		Contact emissions staff AND the Central Control Room immediately
HEPA bank radiation level (GA-6) (meter readout near MEB entrance)	Less than 25 mrem/hour		Exit the MEB now; proceed to CCR, and notify both CCR and the emissions staff.

Sign below and deliver completed forms to emissions staff.

Measurements by:

_____ _____ _____/_____/_____

ESH-1 Signature | Print name | Date

Data reviewed by:

_____ _____ _____/_____/_____

Staff Reviewer Signature | Print name | Date

* If flows are <u>both</u> quite high or low, there may be an emergency situation (assuming the stack flow is normal). Filters may be blown out, or are over-loaded and about to be blown out. Immediately notify Emissions staff on-call.

ESH-17 Air Quality Group

DAILY OPERATIONAL CHECKS OF STACK MONITORING EQUIPMENT AT EXHAUST STACK 3 (ES-3)

This form is from ESH-17-607

DATE:		TIME:	
ITEM	**Desired Value**	**As-Found Value**	**Action if outside desired**
Particulate flow (Merrimac)	----------		
Adjust particulate flow	0.11 ± 0.05 in. H_2O	----------	Contact emissions staff
Total Stack Flow	>0.12 in.. H_2O		Contact emissions staff
Total Stack Flow Chart (V)	Greater than 1.2 V		
Chart paper and pens	Paper OK, pens OK		Change paper or pens
5 liter Integrator Reading	Thumb-wheel set → Displayed values →	6 3 0 - - — — — ═ ═ ═ — — —	Copy the same reading onto the "Stack Report Form" at the stack.
Chart paper and pens	Paper OK, pens OK		Change paper or pens
5 liter Chart Ch. 1 (V)	Greater than zero		Contact emissions staff
5 liter Chart Ch. 2 (V)	Greater than zero		Contact emissions staff
5 liter Sample flow (rack)	----------		
Adjust sample rack flow	1.00 ± 0.05 in. H_20	----------	Contact emissions staff
5 liter Sample flow (inline)	~ 0.85 in. H_20		
5 liter Sample vac. Pressure	~ 10 in. H_20		
East HEPA Bank ΔP	0.5 – 1.0 in. H_2O		Contact emissions staff*
West HEPA Bank ΔP	0.5 – 1.0 in. H_2O		Contact emissions staff*
Tritium Flow (cc/min)	----------		
Adjust tritium sample flow	100 ± 10 cc/min	----------	Contact emissions staff
Temperature (F)	- - - - - - - - -		
50 liter sampling location	A1 / A2 / A3 / **A6**	----------	If OFF, skip next 5 lines.
50 liter Integrator Reading	Thumb-wheel set → Displayed value →	6 3 0 - - — — — ═ ═ ═ — — —	
50 liter Chart (V)	Greater than zero		
Chart paper and pens	Paper OK, pens OK		Change paper or pens
50 liter sample flow (inline)	~ 2 in. H_20		
50 liter sample vac. Press	~ 12 in. H_20		
A-1 Duct pressure	- - - - - - - - -		
A-2 Duct damper position	0 / 45 / 90		
A-2 Duct pressure	- - - - - - - - -		
A-6 Duct damper position	0 / 45 / 90		
A-1 Booster Status	ON / OFF		
A-1 Booster ΔP	- - - - - - - - -		
A-6 Booster Status	ON / OFF		
A-6 Booster ΔP	- - - - - - - - -		
Date of last LN fill	Filled twice a week; within last 4 days		Fill or note on form for emissions staff

Measurements by:

_____ _____ _____/_____/_____

ESH-1 Signature | Print name | Date

Data reviewed by:

_____ _____ _____/_____/_____

Staff Reviewer Signature | Print name | Date

ESH-17 Air Quality Group

DAILY OPERATIONAL CHECKS OF TA-53 KANNE CHAMBERS

This form is from ESH-17-607

DATE:	TIME:

KANNE chamber location	System Readings: current	System Readings: chart volts	Calibration Check (K-412) or Integrator Reading (Model-39)			Flow Pressure
Ring Equipment Building (REB) **Keithley 412**	K-412 Current Amp	Volts V	ZeroBal V	10^{-11} V	10^{-8} V	Flow ΔP
Switchyard (SY) **Keithley 412**	K-412 Current Amp	Volts V	ZeroBal V	10^{-11} V	10^{-8} V	Flow ΔP
A6 (top of doghouse) **Keithley 412**	K-412 Current Amp	Volts V	ZeroBal V	10^{-11} V	10^{-8} V	Flow ΔP
Area A-East Rover **LANL Model 39**	Meter Current pA	Volts V	Full Scale **1 nA**	Integrator Reading - - __ __ __ __ __ __ __ __ __		Flow ΔP
Isotope Production (IP) **Keithley 412**	K-412 Current Amp	Volts V	ZeroBal V	10^{-11} V	10^{-8} V	Flow ΔP
Area A-North Catwalk (AAN) **LANL Model 39**	Meter Current pA	Volts V	Full Scale **10 pA**	Integrator Reading - - __ __ __ __ __ __ __ __ __		Flow ΔP
Area A-South Catwalk (AAS) **LANL Model 39**	Meter Current pA	Volts V	Full Scale **10 pA**	Integrator Reading - - __ __ __ __ __ __ __ __ __		Flow ΔP
Delay Line 20 min. signal (DL-20) **Keithley 485**	K-485 Current nA	Volts V	Flow ΔP			
HRS Dome Air **Keithley 485**	K-485 Current nA	Volts mV	Flow ΔP			

Chart paper and pens OK?	Change paper or pens if paper is low or pens are faint.

Other information documented (as requested and explained in ESH-1 Shift Log or other communication from emissions staff):

Sign below and deliver completed forms to emissions staff.

Measurements by:

_____	_____	_____/_____/_____
ESH-1 Signature	Print name	Date

Data reviewed by:

_____	_____	_____/_____/_____
Staff Reviewer Signature	Print name	Date

6/22/2000

ESH-17 Air Quality Group

STACK REPORT FORM FOR EXHAUST STACK ES-_____

This form is from ESH-17-607

Log #	2000 Date	Time	**Integrator Reading (picocoulombs)** Model 39A electrometer thumb-wheel setting /------ 6 ------\	/------ 3 ------\	/------ 0 ------\	ESH-1 Technician initials / comments
1						
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